Energy Saver

NASA's *Tech Briefs*, a quarterly publication that reports on new technologies available for transfer, has inspired many a spinoff. A recent example is a new commercial energy-saving product developed by engineers of Harris Corporation's Semiconductor Sector, Melbourne, Florida as an extension of an innovation described in *Tech Briefs*.

As part of its energy conservation research in support of the Department of Energy, Marshall Space Flight Center (MSFC) sought a means of curbing power wastage caused by the fact that alternating current motors operate at a fixed voltage. The fixed voltage is what motors need to handle the heaviest loads they are designed to carry, but a motor does not usually operate at full load condition; even when it is idling, the motor is still drawing full-load voltage, causing great power wastage. MSFC engineer Frank Nola developed a device—called the Power Factor Controller—that matches voltage with the motor's need. When it senses a light load, it cuts the voltage to the minimum required, thus effecting large-scale energy savings.

Harris Semiconductor's Peter Shackle, manager of the High Voltage Products Section, and Robert S. Pospisil, lead engineer, read details of the Nola invention in *Tech Briefs* and used the technology as a departure point for a related innovation: an integrated circuit intended to reduce onto one chip most of the circuitry of the Marshall Power Factor Controller for single phase induction motors. Such motors—typically used to power drill presses, sewing machines, conveyor belts, washing machines, dryers and dishwashers—are notoriously inefficient when lightly loaded. The Harris Semiconductor remedy is the HV-1000 Induction Motor Energy Saver (IMES). Heart of the IMES is the tiny silicon chip pictured at left, which connects directly to an alternating current line. IMES continuously monitors the motor and provides it with electrical energy computed by the chip to be the precise voltage required to drive the motor at optimum efficiency. In the photo below, a Harris Semiconductor engineer monitors power measurement equipment during operation of a drill press equipped with the HV-1000 controller. The IMES-equipped drill press uses less than 79 watts; the same drill without the HV-1000 would draw 160 watts.